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# DESCRIPTIONS OF EIGHT NEW GROUND SQUIRRELS OF THE GENERA *SPERMOPHILUS* AND *TAMIAS* FROM CALIFORNIA, TEXAS, AND MEXICO.

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Among the undescribed rodents now in the collection of the Division of Ornithology and Mammalogy of the U. S. Department of Agriculture are eight new ground squirrels of the genera *Spermophilus* and *Tamias*. Five of these are specifically distinct from any heretofore described; the remaining three are well-marked subspecies. They are here described in advance of the more formal publications in which their relations and distribution will be discussed at length.

### Spermophilus nelsoni sp. nov.

NELSON'S SPERMOPHILE.

Type from TIPTON, SAN JOAQUIN VALLEY, CALIFORNIA. No. 54651 ♂ ad. United States National Museum, Department of Agriculture collection. Collected June 24, 1893, by C. P. Streator (original number, 2968).

*Measurements* (taken in flesh).—Type specimen, ♂: total length, 228; tail vertebræ, 71; hind foot, 41. Mean of 29 specimens from type locality: total length, 228.6; tail vertebræ, 68.4; hind foot, 40.4.

*General Characters.*—Belongs to the subgenus *Ammospermophilus;* similar to *S. leucurus* in form and pattern of markings, but somewhat larger and widely different in color, the upper parts being yellowish-brown.

*Color.*—Upper parts dull yellowish-brown or buffy clay-color, which color covers the outer surfaces of the legs and the proximal third of the upper side of the tail; a white stripe on each side reaching from behind shoulder to rump; under parts, feet, and eyelids soiled whitish, the feet more or less strongly suffused with buffy. Tail above: proximal third buffy clay-color like back; distal two-thirds mixed black and whitish with a whitish border; tail below: soiled or buffy whitish, bordered on distal two-thirds with a broad subterminal black band, and edged with whitish. There is also a very narrow black zone at the base of the tail hairs. The upper parts are rather coarsely lined with black hairs which are absent from the legs, giving the latter a slightly different tint, and in some specimens the ground color of the legs and sides just above the forelegs is different, being suffused with dull buffy ochraceous. The fall and winter pelage is darker and softer than the summer pelage.

*Cranial Characters.*—Skull similar to that of *S. leucurus*, but larger and broader; audital bullæ conspicuously larger, more inflated and distinctly corrugated. The corrugations are due to the presence of two transverse constrictions, marking the position of vascular canals; they are faint or absent in *leucurus*, *harrisi*, and the other previously described forms. The rostrum and nasal bones are somewhat longer, and the upper incisors and first upper premolar are larger than in *leucurus*.

*Specimens Examined* (all from San Joaquin Valley, California).—Total number, 52, from the following localities: Tipton (type locality), 32; Huron, 7; Adobe Station, 1; Alila, 2; Lerdo, 2; Poso, 3; Temploa Mountains, 2; Lake Buena Vista, 3.

*General Remarks.*—The difference between *Ammospermophilus nelsoni* and the previously known members of the group is much more decided than between any of the others. The animal is larger, paler, and very different in color, the upper parts being everywhere from nose to tail a uniform dull yellowish or buffy clay-color, rather coarsely lined with black hairs. The cranial peculiarities have been already described. The fall molt evidently takes place early and progresses from behind forward, as shown by the 13 specimens collected by Mr. Nelson in October. All of these have completed or nearly completed the change, the only old hairs remaining being on the head and belly. In some of the specimens from Poso the pale, buffy clay-color of the head, still in worn summer pelage, is in striking contrast

with the much darker tints of the neck and back which are completely covered with the new coat. The two are separated by a sharp line of demarkation that crosses the occiput between the ears.

Heretofore no species of the *Ammospermophilus* group has been recorded from the San Joaquin Valley, or in fact from any point west of the great divide. It is remarkable that a diurnal mammal as conspicuous as the present species, and one inhabiting a region traversed by a railroad over which numerous mammal collectors have passed again and again, should have remained undescribed to the present day.

**Spermophilus perotensis** sp. nov.

PEROTE SPERMOPHILE.

Type from Perote, Vera Cruz, Mexico. No. 54274 ♀ ad. United States National Museum (Department of Agriculture collection). Collected by E. W. Nelson June 8, 1893 (original number, 4976).

*Measurements* (taken in flesh).—*Type specimen*: Total length, 253; tail vertebræ, 68; hind foot, 39. Average of 14 specimens from type locality: total length, 249; tail vertebræ, 69; hind foot, 38.5.

*General Characters.*—This spermophile does not require comparison with any known species. In size and external appearance it resembles *S. elegans* of Wyoming, but its cranial characters show it to belong to another subgenus (*Xerospermophilus*). Ears a mere rim; tail rather short.

*Color.*—Upper parts grizzled yellowish brown, vermiculated posteriorly by irregularly interrupted lines of black (which in immature specimens, and probably also in new pelage in adults, form the posterior borders of indistinct buffy spots); eyelids white; under parts and feet buffy. Tail above, grizzled yellowish brown and black, the black predominating on the distal half; below, ochraceous buff, with a distinct subapical band of black encircling the distal half or two-thirds.

*Cranial Characters.*—In cranial characters *Spermophilus perotensis* clearly belongs to the subgenus *Xerospermophilus*, and to that part of the subgenus from which the ancestors of *S. mexicanus* branched off. The adult skull is larger and heavier than that of any other known member of the *spilosoma* group, and resembles *S. spilosoma major* more closely than any other species. The parietals are much more highly arched above the supraoccipital, the highest point being between the postorbital pro-

cesses, behind which they are even more abruptly decurved than in *S. mexicana;* the supraorbital foramina are completely inclosed in the superciliary shelf. Molars heavy, their crowns very broad antero-posteriorly; first upper premolar relatively large. In many respects the skull of *S. perotensis* resembles that of *S. mexicanus.*

*Geographic Distribution and Faunal Position.*—The range of this species, according to Mr. Nelson, is "the extreme eastern border of the Mexican table-land at Perote, Vera Cruz, at an altitude of 7,800 or 7,900 feet." Its faunal position is along the upper border of the Upper Sonoran zone.

*General Remarks.*—Sixteen specimens of this new Spermophile are before me, all collected at Perote by Mr. Nelson. They vary but little, except in the degree of visibility of the obsolescent spots and the tint of the upper parts—differences resulting from the wearing off of the tips of the hairs.

### Spermophilus spilosoma annectens sp. nov.

PADRE ISLAND SPERMOPHILE.

Type from Padre Island, Texas. No. $\frac{30410}{42396}$ ♂ yg.-ad. United States National Museum, Department of Agriculture collection. Collected August 24, 1891, by William Lloyd (original number, 694).

*Measurements* (taken in flesh).—Total length, 220; tail vertebræ, 60; hind foot, 36. In 8 adults from the type locality the tail vertebræ vary from 55 to 75 mm. and the hind foot from 35 to 38 mm.

*General Characters.*—*S. annectens* is about the size of *S. spilosoma major*, which it resembles in coloration and markings, though the pelage has a grayish cast suggesting *S. obsoletus.* Ear a mere rim, about 3 mm. high at highest point.

*Color.*—Upper parts dull grayish brown; back beset with ill-defined buffy spots, margined posteriorly with dusky in unworn pelage; under parts soiled white. Eyelids white. Tail concolor with back or a little more fulvous, its distal half or two-thirds bordered with a subapical black band beyond which the tips of the hairs are buffy-ochraceous. Immature specimens and young of the year are more brownish than the adults and show the spots much more distinctly, as usual in the *spilosoma* group.

*Cranial and Dental Characters.*—Compared with *S. spilosoma major*, the skull of *S. annectens* is longer, but is actually as well as relatively narrower across the zygomatic arches, particularly anteriorly, where the anterior roots are pinched in as in *Ictidomys;* frontals broader interorbitally; fronto-nasal region more

convex; supraorbital foramina usually completely inclosed; postorbital processes more strongly decurved; audital bullæ smaller; postzygomatic notch almost obsolete; rostrum broader across the base, with the lateral angle less marked. Under jaw larger and heavier, with posterior edge of inflected angular process broader, shorter, and less transverse. The cranium as a whole is narrower and higher than in any known member of the subgenus *Xerospermophilus*.

The dentition is unusually heavy for the subgenus, and the crown of the last upper molar is about as long antero-posteriorly as transversely. The first upper premolar is about one-third the size of the second. In all of these respects, except the character of the angular process of the mandible, the cranial peculiarities of *S. annectens* depart from the *S. spilosoma* type and resemble the *S. mexicana* type.

*General Remarks.*—Fourteen specimens of this animal are in the Department collection, 13 from Padre Island, Texas, and 1 from the mainland at the mouth of the Rio Grande. Padre Island is a long spit of sand in the Gulf of Mexico just north of the mouth of the Rio Grande.

**Spermophilus beecheyi fisheri** subsp. nov.

FISHER'S GROUND SQUIRREL.

Type from KERN VALLEY, CALIFORNIA (25 miles above Kernville). No. $\frac{29318}{41385}$ ♂ ad. United States National Museum, Department of Agriculture collection. Collected July 6, 1891, by Dr. A. K. Fisher (original number, 741).

*Measurements of Type Specimen* (taken in flesh).—Total length, 415; tail vertebræ, 175; hind foot, 58.

*General Characters.*—Similar to *S. beecheyi*, but everywhere much paler; sides of neck and shoulder-stripes clear silvery white, in striking contrast with the color of the body; sides of body thickly beset with indistinct whitish spots, narrowly bordered with dusky posteriorly. (In true *beecheyi* the spots are much less numerous, less distinct, and tend to run together so as to form irregular transverse bands.) Ear stripe not sharply defined and not so pure black as in *beecheyi*; eyelids and lower part of face whitish; under parts and feet buffy.

*General Remarks.*—This large ground squirrel is by far the most striking and handsome of the subgenus *Otospermophilus*, and I take pleasure in naming it in honor of one of the naturalists of the Death Valley Expedition, Dr. A. K. Fisher, who col-

lected the type specimen. Numerous specimens were obtained by the expedition in Kern Valley, Walker Pass, Owens Valley, and in the Coso, Argus, and Panamint Mountains, California.

**Spermophilus chrysodeirus brevicaudus** subsp. nov.

SAN BERNARDINO SPERMOPHILE.

Type from San Bernardino Peak, California. No. 56661 ♀ ad. United States National Museum, Department of Agriculture collection. Collected October 9, 1893, by J. E. McLellan (original number, 274).

*Measurements of Type Specimen* (taken in flesh).—Total length, —; tail vertebræ, —; hind foot, —.

*General Characters.*—Similar to *S. chrysodeirus*, but with much shorter tail, somewhat shorter hind foot, and duller mantle over head and shoulders. The tail averages about 75 mm., while that of *chrysodeirus* averages 90 mm. or more.

*Color* (of type specimen).—Back and rump grizzled gray tinged with brownish; sides paler; a dull fulvous mantle over head and neck, hardly reaching shoulders; color of head shading toward brick-red; sides of neck behind ears buffy-ochraceous; a broad whitish stripe, bordered on each side by a broad black stripe, extends from the shoulder to the rump on each side, and the white reaches beyond the black in both directions; hind foot dull whitish; tail above, proximal half grizzled; distal half black, edged with fulvous; tail below, chestnut, bordered with black and edged with fulvous.

Number of specimens examined, 7; all from San Bernardino Mountains, California.

**Tamias panamintinus** sp. nov.

PANAMINT CHIPMUNK.

Type from Panamint Mountains, California (between Death Valley and Panamint Valley). Exact locality, Johnson Cañon. No. $\frac{27603}{39702}$ ♂ ad. United States National Museum, Department of Agriculture collection. Collected by E. W. Nelson April 3, 1891 (original number, 723).

*Measurements of Type Specimen* (taken in flesh).—Total length, 208; tail vertebræ, 96; hind foot, 31. Ear from notch, 16 (measured in dry skin). Average measurements of 50 adult specimens from type locality: total length, 208; tail vertebræ, 90.4; hind foot, 31.

*General Characters.*—About the size of *T. quadrivittatus*, but resembles *T. speciosus* much more closely in coloration, being a paler form with obsolescent facial stripes and less distinct dorsal stripes, which are shorter posteriorly, leaving the rump clear gray. Ears smaller than in *speciosus;* ear stripes nearly obso-

lete. Tail rich orange-rufous both above and below and only narrowly margined with black. Hind foot shorter than in any other member of the *speciosus* group.

*Color.—Winter pelage:* Top of head and rump ash gray; back of neck and inner pair of dorsal light stripes pale vinaceous drab, fading into gray posteriorly; dorsal stripes short, not continuing over rump; outer pair of light stripes dull whitish; all five dark dorsal stripes dull fulvous; sides gray, washed with buffy ochraceous. Face stripes indistinct; those below the eye obsolete. *Tail:* upper surface rich orange rufous (from the broad sub-basal zone of this color), which is only heightened by the narrow subapical zone of black and the yellowish tips of the hairs; under surface deep orange rufous, with a narrow submarginal band of black, bordered with yellowish.

*Summer Pelage:* Similar to winter pelage, except that the sides and dark dorsal stripes are suffused with ferruginous, and the median part of the central stripe is blackish posteriorly.

*Cranial Characters.*—Skulls of *T. panamintinus* resemble those of *T. quadrivittatus* from the type locality in Colorado so closely that the two are hardly distinguishable, though the skull of the Panamint animal is slightly smaller and more depressed in the fronto-nasal region, and has larger audital bullæ. Contrasted with *T. speciosus*, the brain case is flatter and the audital bullæ conspicuously larger.

*General Remarks.*—In winter pelage *panamintinus* differs from *speciosus*, the only form with which it requires comparison, in having all of the stripes less distinct, particularly those of the face and ears; the dorsal stripes shorter, not running back over the rump, which is clear gray; the outer pair of white stripes narrower, shorter, and less pure white; the dark dorsal stripes pale fulvous instead of dark umber; the shoulders and back of the neck suffused with buffy-ochraceous instead of being gray, and the rufous of the distal half of the tail not obscured by black.

In summer pelage it resembles *speciosus* much more closely, but may be distinguished by less vivid tints, paler facial stripes, narrower outer dorsal white stripe, obsolescent ear stripes, pale gray rump, and by the small amount of black on the tail. In all pelages the black on the tail is very much restricted, permitting the rufous to show through on the upper surface for its entire length, thus imparting to it a peculiar ruddy glow not seen in any other species.

*Geographic Distribution.—Tamias panamintinus* is an inhabitant of the desert ranges of the west side of the Great Basin in California and Nevada, where 110 specimens were obtained by the Death Valley Expedition.

**Tamias callipeplus** sp. nov.

MOUNT PIÑOS CHIPMUNK.

Type from summit of MOUNT PIÑOS, VENTURA COUNTY, CALIFORNIA. No. $\frac{312992}{431164}$ ♂ yg.-ad. United States National Museum, Department of Agriculture collection. Collected by E. W. Nelson October 20, 1891 (original number, 1344).

*Measurements of Type Specimen* (taken in flesh).—Total length, 212; tail vertebræ, 92; hind foot, 33.5. Average measurements of four specimens from type locality: total length, 210; tail vertebræ, 91.7; hind foot, 34.

*General Characters.*—Agrees with *speciosus*, its nearest relative, in size, proportions, and pattern of markings, including the great breadth of the outer white dorsal stripe. It differs from *speciosus* in having the thighs and rump yellowish instead of gray, the back of the neck and inner pair of light dorsal stripes vinaceous-drab instead of gray; the post-auricular patches larger, purer white, and more sharply defined, and the black on the tail much less extensive. Ears large.

*Color.—Winter pelage:* No gray anywhere; top of head, back of neck, and inner pair of light dorsal stripes vinaceous drab, tinged with ochraceous on the shoulders, becoming fulvous on the flanks, and yellowish on the thighs and rump; outer white stripes very broad (as in *speciosus*) and slightly obscured posteriorly by dark-tipped hairs; median dorsal stripe dark umber-brown, bordered and obscured by rusty; inner pair of dark stripes ferruginous; outer pair fulvous, not defined below, passing into fulvous of flanks; post-auricular spots large, sharply defined, and pure white; ear stripes sharp, the posterior pure white, the anterior black, edged in front basally with rusty; facial stripes intensely colored and sharply defined, the middle or orbital stripe black, becoming rusty at the base of the ear; feet faintly washed with fulvous; tail orange rufous, broadly tipped and narrowly bordered with black, and edged with yellowish; the rufous obscured on upper surface by black subapical and yellowish apical zones on the hairs; belly and throat pure white, the dark basal color showing through in places.

*Cranial and Dental Characters.*—No cranial characters of importance have been discovered, though the brain case is slightly

more arched in the posterior frontal region than in *speciosus*. The molariform teeth are somewhat heavier, and the last upper molar has the heel more developed.

*General Remarks.*—*Tamias callipeplus* differs from both *speciosus* and *panamintinus* in having the hinder parts of the body yellowish instead of gray, and in the purer white and larger size of the post-auricular spots. It agrees with *panamintinus* and differs from *speciosus* in the vinaceous tinge of the back of the neck and inner pair of pale dorsal stripes, and in the color of the tail. It differs from *panamintinus* and agrees with *speciosus* in the brightness and sharpness of the facial stripes and ear stripes, the great breadth of the outer pair of dorsal white stripes, in the posterior extension of the dorsal stripes over the rump, and in the large size of the hind foot.

*Tamias callipeplus* is treated as a full species instead of a subspecies on account of its isolated geographic position, intergrades being impossible because the mountains on both sides of Mount Piños do not attain sufficient altitude to provide the cool temperature required by the species.

### **Tamias alpinus** sp. nov.

ALPINE CHIPMUNK.

Type from Big Cottonwood Meadows, High Sierra, California, just south of Mount Whitney (altitude, 3,050 meters or 10,000 feet). No. $\frac{30597}{42491}$ ♀ yg.-ad. United States National Museum, Department of Agriculture collection. Collected by Basil Hicks Dutcher August 12, 1891 (original number, 191).

*Measurements of Type Specimen* (taken in flesh).—Total length, 189; tail vertebræ, 82; hind foot, 29. Ear from notch, 13 (in dry skin). Average measurements of 15 specimens from type locality: total length, 185; tail vertebræ, 79; hind foot, 29.3.

*General Characters.*—Size, small; resembles *T. minimus pictus* in size, proportions, and general appearance, but is much paler in breeding pelage and much more ferruginous in midsummer pelage; may be distinguished from *pictus* in all pelages by the tail, which is much broader and more bushy, hoary above, and broadly tipped with black both above and below.

*Color.*—*Fall pelage:* General color of upper parts, hoary gray, suffused on the flanks with buffy-ochraceous; median dorsal stripe dusky, obscured by pale rusty; lateral dorsal dark stripe pale ferruginous; inner pair of white stripes hoary gray; outer pair white and very broad (as in *speciosus*); post-auricular

patches whitish, not sharply defined; facial stripes pale; ear stripes indistinct; legs and feet gray. Tail: upper surface hoary (rarely yellowish), becoming black toward the tip (the individual hairs buffy gray sub-basally, then black, and broadly tipped with pale buffy gray or yellowish); under surface, pale buffy fulvous, bordered and broadly tipped with black, broadly edged laterally with pale buffy.

*Summer Pelage:* Dorsal dark stripes bright ferruginous; facial stripes strengthened by dull rusty; flanks bright fulvous, the fulvous reaching forward over shoulders to sides of neck.

*Cranial Characters.*—Skull similar in size and general appearance to that of *T. minimus pictus*, but with longer nasals and nasal branches of premaxillaries. The length of the nasals equals or exceeds the combined length of the basioccipital and basisphenoid. In *minimus* the nasals fall considerably short of this measurement.*

*General Remarks.*—The Alpine chipmunk is one of the two smallest chipmunks known, the other being the Sage Plains species (*T. minimus*), which it resembles in general appearance, except in the full summer pelage. In all pelages it may be distinguished from *minimus* by the tail, which is hoary above (rarely yellowish); is broader and more bushy, and has the black terminal part much longer. The outer pair of white dorsal stripes also are much broader, as in *speciosus*. In spring and early summer, before the post-breeding molt, the animal is very much paler than the palest specimens of *minimus pictus*. In midsumer pelage, on the other hand, the sides and dark stripes are deeper ferruginous than ever seen in the brightest summer specimens of *minimus pictus* or even *minimus consobrinus*, and in high-colored individuals even the inner pair of light stripes are sometimes obscured by rusty.

*Geographic Distribution.*—This beautiful little chipmunk is restricted, so far as known, to the alpine summits of the High Sierra, where it lives among rocks at timber-line, ranging a little above and a little below the upper limit of tree growth. Thus the haunts of the alpine chipmunk are the same as those of the pika (*Lagomys*), the alpine marmot (*Arctomys flaviventer*), and the mountain sheep (*Ovis canadensis*). No mammal ranges higher. Sixty specimens were obtained by the Death Valley Expedition.

*This has been verified in 100 skulls, 50 of *alpinus* and 50 of *minimus* and subspecies.